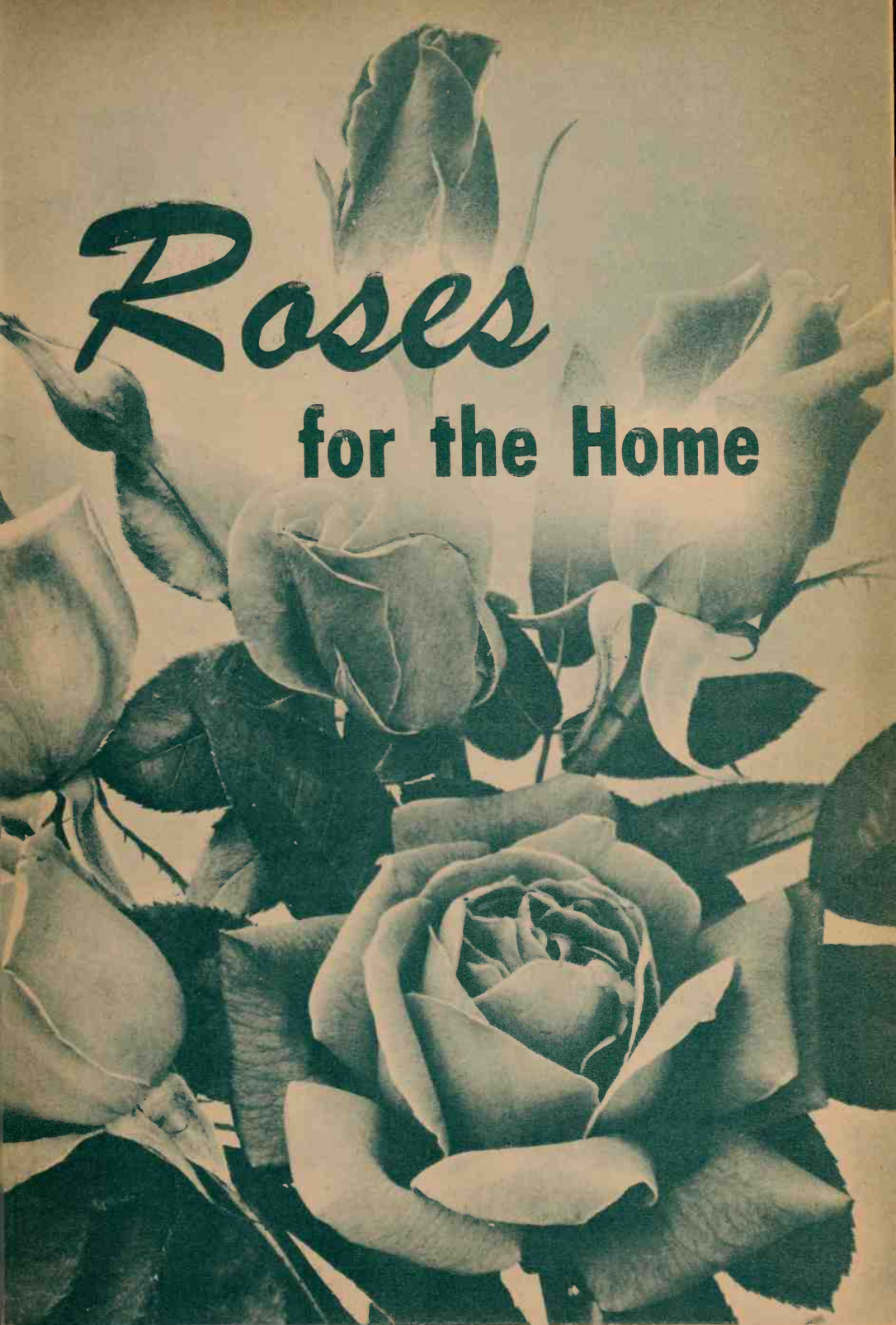

Roses for the Home

HOME AND GARDEN BULLETIN NO. 25 • U.S. DEPARTMENT OF AGRICULTURE

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Roses for the Home

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Roses are probably the most popular of all garden flowers. They can be grown in every part of the country and are adapted to many decorative purposes.

Varieties of roses are available for planting on lawns and borders, for growing on arbors and trellises or as specimen tree roses, and for use as bedding plants, as hedges, and as a source of cut flowers.

New varieties, developed by plant breeders, are introduced each year. These new varieties are available in a wide range of colors and forms.

For success in growing garden roses—

- Buy vigorous plants from a reputable local nursery, retail store, or mail-order nursery.
- Select a planting site that receives at least 6 hours of sunshine daily.
- Set plants in well-prepared beds.
- Water them frequently.
- Cut flowers from the plant without damaging the remaining parts of the plant.
- Prune the plants every year.
- Spray or dust regularly to prevent insect or disease damage.
- Protect the plants from winter injury.

Though some kinds of wild roses are very desirable and may be found in many gardens, they are gradually being replaced by named varieties.

Kinds of Roses

Roses are separated into two main classes—bush roses and climbing roses—by their habits of growth. Full-grown bush roses are 1 to 6 feet high and require no support. Climbing roses produce long canes and must be provided with some kind of support.

Bush Roses

The bush roses are grouped into types according to their flowering habit, winter hardiness, and other traits. The types of bush roses are hybrid tea, floribunda, grandiflora, polyantha, hybrid perpetual, shrub, old fashioned, tree or standard, and miniature.

Hybrid Teas

Hybrid teas are the so-called monthly or everblooming roses. They are more widely grown than all other types of roses combined. When the word "rose" is used, it generally suggests a hybrid tea variety.

M–5001

Hybrid tea rose, "Charlotte Armstrong."

BN–19398

Floribunda rose, "Girl Scout."

Mature hybrid tea rose bushes are 2 to 6 feet high, the height depending on variety. The flowers vary from singles, which have but one row of petals, to doubles with many rows. In general, the buds are pointed and long, and the flowers are borne one to a stem or in clusters of three to five. Hybrid tea varieties are available in a wide range of colors, including pure white, and many shades of red, yellow, pink, and orange. All varieties are good for cutting, although some have short stems.

Most hybrid teas have some fragrance. This characteristic, however, is variable. When fragrance is present it is usually most intense in the early morning before the fragrant oil has evaporated from the base of the petals.

Most hybrid teas are winter hardy in areas where the winter temperatures do not often go below zero, but varieties differ in cold resistance. In sections where winters are severe, practically all varieties need some protection.

Floribundas

Floribunda roses bear their flowers in clusters, and the individual blooms of many of them closely resemble hybrid teas. They are increasing in popularity, especially for bed plantings where large numbers of flowers are wanted. Floribundas will tolerate more neglect than any other type of rose, with the possible exception of some of the shrub species.

Grandifloras

Grandiflora roses resemble hybrid teas in type of bloom—single on long stems—and in hardiness. Though the flowers are somewhat smaller than those of hybrid teas, grandifloras bloom more abundantly. The flowers are good for cutting.

Polyanthas

Flowers of polyantha roses are smaller than those of the grandifloras

and are borne in rather large clusters. The clusters are similar in form and in size of individual flowers to many of the climbing roses, to which the polyanthas are closely related. The polyanthas are hardy and may be grown in many areas where hybrid teas are difficult to grow. Their chief use is in bed plantings or in borders with perennials. They are excellent for mass plantings.

Hybrid Perpetuals

Hybrid perpetuals are the June roses of grandmother's garden. Their flowers are large. Generally they lack the refinement of hybrid teas; an exception is the white-flowered variety Frau Karl Druschki, which many consider the finest white rose in existence.

Prior to the development of modern hybrid teas, hybrid perpetual roses were very popular. As their name indicates, they are considered as everblooming types, although most of them do not bear continuously through the growing season as do hybrid teas. They usually develop large, vigorous bushes if given good cultural care and proper pruning. They are very hardy and stand low winter temperatures without protection.

Shrub Roses

Shrub roses are actually a miscellaneous group of wild species, hybrids, and varieties that develop a large, dense, type of growth that is useful in general landscape work. They are hardy in all sections of the country. While their flowers do not equal in size or form those of other types of roses, many bear very attractive seed pods in the fall. They have fine-textured foliage and some are quite useful for hedges or screen plantings.

Old-Fashioned Roses

Old-fashioned roses include the varieties and species that were popular in Colonial gardens. Though the flowers of old-fashioned roses are not as attractive as those of newer varieties, they usually are much more fragrant. These roses are all very hardy, require little care, and furnish an abundance of flowers in June.

Among the varieties occasionally found in gardens are:

Rosa centifolia (cabbage rose)	Light pink
Moss roses	Pink
Cardinal de Richelieu	Purplish red
Rosa mundi	Striped white and red
York and Lancaster	Pink and white and variegated

Tree, or Standard, Roses

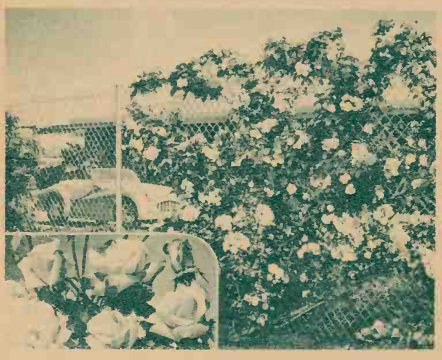
Tree, or standard, roses are distinctive because of the form of the plant rather than the type of flower. They are made by grafting any of the bush-type roses on upright trunks. Many of the better-known varieties of bush roses are available as tree roses. Tree roses are used in formal plantings or are used to accent a particular part of the garden. In sections where winters are severe the plants need special protection.

Miniature Roses

Miniature rose plants, including leaves and flowers, are very small; for some varieties the maximum height is about 6 inches. Miniatures are used mostly for rock gardens, edging beds, and borders.

BN–19395

Miniature rose, "Opal Jewel."



BN–19396

Climbing floribunda rose, "Climbing Circus."

Climbing Roses

Climbing roses include all varieties that produce long canes and require some sort of support to hold the plants up off the ground. They are often trained on fences or trellises, and some are used without support to cover banks and aid in holding the soil in place. Climbing roses are rather hardy. They are becoming more popular with the development of finer varieties.

Climbing roses, like bush roses, are grouped into several types. There is much overlapping among types, and some varieties could qualify under several. Most rose catalogs list the following types: Ramblers, large-flowered climbers, everblooming climbers, climbing hybrid teas, climbing polyanthas, climbing floribundas, and trailing roses.

Ramblers

Rambler roses are very rapid growers. They sometimes develop canes as long as 20 feet in one season. The flowers are small—less than 2 inches across—and are borne in dense clusters. The plants flower only once during a season and on wood that was produced the preceding year. The foliage is glossy and the plants are very hardy; but, unfortunately, many varieties are very susceptible to mildew. They are being replaced by other climbing types that bear larger flowers during a long growing season and are less subject to mildew.

Large-Flowered Climbers

Large-flowered climbers grow slowly in comparison with ramblers. They are often trained on posts or some other type of support, and may require rather heavy annual pruning to keep them in bounds. These roses are well adapted to small gardens where they may be trained against a wall, fence, or small trellis. When the plants are grown well, the flowers are rather large and are useful for cutting. Many varieties do not bloom as freely when the canes are trained vertically as they do when canes are trained horizontally.

Everblooming Climbers

Everblooming climbers usually bear an abundance of flowers in early summer. After this period of heavy bloom, the plants produce a few scattered flowers until fall. Then if growing conditions are favorable, the plants again may bear heavily.

Plant breeders are improving this type of rose rapidly. Some everblooming climbers are available that bloom as continuously as hybrid teas and are more winter hardy.

Climbing Hybrid Teas

Climbing hybrid tea roses have originated as seedlings and as chance sports of bush varieties.

When a bush hybrid tea produces a cane that has the climbing character, the new type of plant is usually given the same name as the bush variety from which it originated—for example, Climbing Crimson Glory.

The climbing forms of hybrid teas, in general, do not bloom as continuously as their bush parents. The flowers, foliage, and other characters, however, are usually identical. The climbing hybrid teas are just as susceptible to winter injury as the bush forms.

Climbing Polyanthas and Floribundas

These types, like the climbing hybrid teas, originated as sports and seedlings from polyanthas and floribundas. The flowers of these sports are generally identical with the bush forms from which they originated, and they also are fairly continuous in blooming. They are hardier than the climbing hybrid teas, but not hardy enough to withstand severe winter climates unless protected.

Trailing Roses

Trailing roses are climbers adapted to planting on banks or walls. They produce long canes that creep along the ground, making a pleasing ground cover. Their flowers are not so attractive as other types, but they are hardy and have a place in some gardens.

Buying Plants

Buy your rose plants from reputable sources. Generally, local nurseries and garden centers are good sources of planting material. Retail stores—drug stores, supermarkets, and department stores—also are good sources if their stock has been kept dormant and has been protected from drying.

You can also get a good selection of high-quality plants from mail-order nurseries and nursery departments of mail-order houses. Reputable mail-order organizations will send you catalogs listing the plants that they sell. They will guarantee their plants to grow and bloom if given normal care.

For help in deciding which of the many varieties of roses to buy, get catalogs from several of the large nurseries or nursery departments of mail-order houses. The varieties listed in these catalogs generally are favorites with rose growers and you are likely to be satisfied with any of them.

Members of local garden clubs and rose societies are sources of specific information regarding the varieties that do well in your locality.

BN–19397

Roses grow best where they have sunshine all day, but will grow satisfactorily where they have at least 6 hours of sunshine daily.

Planting Sites

Roses grow best where they have full sunshine all day. They will grow satisfactorily, however, if they have at least 6 hours of sun a day.

If you must plant roses where they are shaded part of the day and have a choice as to morning sun or afternoon sun, plant them where they have morning sun. If plants are shaded in the morning, their leaves remain wet with dew a few hours longer than if they were in morning sun. Moisture on the leaves is favorable for the development of several leaf diseases.

Planting Times

The proper time to plant packaged roses depends on the severity of winter temperatures in the area, as follows:

- If winter temperatures do not go below 10°, plant at any time the bushes are fully dormant.
- If winter temperatures do not go below −10°, plant in fall or spring.
- If winter temperatures regularly go below −10°, plant in spring only.

Some nurseries and garden centers sell roses that are planted in containers. These container-grown roses can be transplanted at any time from spring to fall.

Spacing Plants

Space hybrid teas, grandifloras, polyanthas, and floribundas about 2 feet apart in areas where winter temperatures are very cold (−10° or below), about 2½ feet apart where winter temperatures are moderate (10° to −10°), and at least 3 feet apart where winter temperatures are mild (above 10°). In all areas, space hybrid perpetuals 3 to 5 feet apart and climbers from 8 to 10 feet apart.

Soil Preparation

If you are planting only a few roses, dig individual planting holes for them. Make the holes 12 inches deep and at least 18 inches in diameter. If you are planting a large number of roses in one bed, prepare the bed by spading the soil to a depth of about 12 inches. Then, dig planting holes in the prepared bed.

Any good garden soil will produce good roses. If you can grow good grass, shrubs, and other plants, your soil probably needs no special preparation for roses. If your soil is very heavy, or if it is light and lacking in fertility, or if the builder of your house has used subsoil from the basement excavation to level your lot, you can improve your soil by adding organic matter.

Use peat moss, leafmold, or manure for organic matter. Most gardeners prefer to use manure. Dehydrated cow manure is available from garden-supply stores. If you use manure, add about one-half pound of superphosphate to each bushel.

Spread a layer of organic matter 2 to 4 inches deep over the spaded bed. Work the organic matter into the soil to spade depth.

If you are digging planting holes in unprepared soil, mix soil from the holes with organic matter. Use one part of peat or leafmold to four parts of soil or one part of manure to six parts of soil. Mix thoroughly.

After planting holes are dug, either in beds or unprepared soil, loosen the soil in the bottom of the hole and work in about half a spadeful of well-rotted manure. Do not use fresh manure; it may injure any roots coming in contact with it.

Prepare beds and dig planting holes well in advance of planting so the plants can be set out as soon as they are received. Prepare the soil in fall, whether for fall or spring planting. If the soil has to be completely reworked, do it at least 4 weeks before planting.

Handling Plants

Unless plants are frozen when they are delivered, unpack them at once. If they are frozen, store them where they can thaw out gradually; do not unpack them until they are completely thawed.

Inspect the roots for drying. If they are dry, soak them in water for an hour or two.

The plants are best planted as soon as they are received. If you cannot plant them immediately, moisten the packing material and repack the plants. They can be kept this way safely for 2 or 3 days.

If you must hold the plants for more than 2 or 3 days before planting, heel them in. That is, place them in a trench and cover the roots with moist soil. If the canes are dry, cover them with soil also.

When you are ready to set out the plants, examine their roots. Cut off all dead or injured growth. Remove broken or dead canes and, if necessary, cut the canes back to about 12 inches in length. Nurseries usually cut the tops back to about 12 inches before shipping the plants. If the tops have been cut back, do not cut them further; flowering usually is delayed if canes are cut back to less than 10 inches.

Protect the roots from drying at all times. Never expose them to sun or drying winds. Move the plants to the garden with their roots in a bucket of water or coat the roots with a thin clay mud and keep them covered with wet burlap or some other protection until planted.

Setting the Plants

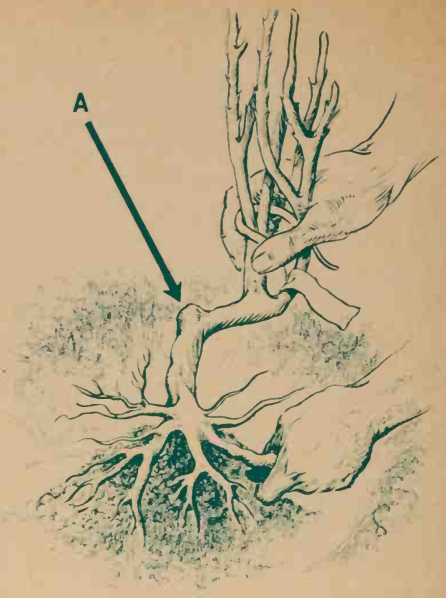
Place a small, cone-shaped pile of soil in the center of each planting hole. Set the plant on the peak of the cone and spread the roots down the slope.

If winter temperatures in your area regularly go below $-10°$, make the top of the cone low enough so the bud union of the plant is about 2 inches below the ground level. If the temperatures go below 10° but not lower than $-10°$, set the bud union 1 inch below ground level. If winter temperatures are warmer than 10°, set the bud union at the ground level or slightly below it.

Carefully work soil about the roots so all roots are in contact with the soil. When the roots are covered, add water to help settle the soil about the roots. Then fill the hole.

Mound the soil 8 to 10 inches high around the canes of bush and climbing roses and 3 to 4 inches high around the canes of miniature roses. Remove the soil mound when frost danger is past.

After setting tree roses, drive a sturdy pole into the soil beside the upright trunk and tie the trunk to the pole. This prevents the trunk from whipping in the wind and loosening the roots.



A small cone-shaped pile of soil, placed in the center of the planting hole, aids in spreading the roots uniformly in the hole and in adjusting the planting depth of the bush. When the plant is set on the cone, the bud union (*A*) should be slightly below ground level.

Cultivating and Mulching

Cultivate roses carefully; their roots may grow close to the surface and may be injured by deep cultivation. The main purpose of cultivation is to remove weeds. This can be done by hand pulling the weeds or cutting them at the soil surface.

Use a mulch to aid in controlling weeds, conserving moisture, and adding fertility. Peat, ground corncobs, ground tobacco stems, buckwheat and cottonseed hulls, spent mushroom manure, and well-rotted strawy manure are effective as mulching materials.

Apply mulches about a month before the roses bloom. Remove all weeds

and rake the soil lightly before applying mulches. Then spread the mulching material evenly around the plants to a depth of 2 or 3 inches.

Keep the mulch on the soil throughout the year. The mulching material decays and becomes incorporated in the soil. Add new material as the mulch settles and becomes thin about the plants.

Watering

Roses need large amounts of water. Even where rainfall is plentiful, occasional waterings are beneficial.

Soak the soil thoroughly to a depth of 8 to 10 inches. Direct a small, slow-moving stream of water from a garden hose around the bases of the plants. A heavy stream usually is wasteful; most of the water runs off and fails to penetrate the soil more than a few inches.

Fertilizing

Roses grow best in soil that is medium to slightly acid (pH 5.5 to 6.5). To determine whether the acidity of your soil is within the best range for roses, have it tested or test it yourself.

Your State agricultural experiment station will test your soil and give directions for changing the soil's acidity, if necessary. Ask your county agricultural agent how to prepare the soil sample or write to your State agricultural experiment station for this information.

You can make your own test for soil acidity with testing kits sold by garden-supply stores. These kits are inexpensive and easy to use.

If you find the soil pH to be below 5.5, apply agricultural lime at a rate of 3 or 4 pounds per 100 square feet. If the pH is over 6.5 apply sulfur. Use 1 pound of sulfur per 100 square feet if the pH is between 7 and 7.5, 2 pounds if it is 8, and 3 pounds if it is 8.5.

Acidity of the soil can change quickly; therefore, check the pH at monthly intervals after treating to see if another application of lime or sulfur is needed.

The fertilizer elements most likely to be deficient in garden soil are nitrogen, phosphorus, and potassium. To supply these elements, use a complete fertilizer. Grades 5–10–5, 4–8–4, or 4–8–6 are satisfactory.

Apply complete fertilizers at a rate of about 3 pounds per 100 square feet or one heaping tablespoon for each plant. Spread the fertilizer evenly around the plants, scratch it into the soil surface, then water.

Apply the fertilizer when new spring growth is well established and all danger of severe freezing is past. A second application can be made later in the season if the plants show evidence of mineral deficiencies—yellowing of leaves from lack of nitrogen, leaves turning grayish green from lack of phosphorus, or browning of leaf margins from lack of potassium.

Do not apply fertilizers in cold climates after July 15 or in mild climates after August 15. When applied late in the season, fertilizers may stimulate fresh growth and delay hardening of the wood before winter sets in.

Some soils are deficient in calcium. Calcium deficiency causes the margin of the rose leaflets to die. Eventually the entire leaf dies and drops off. The flowers may be deformed with brown spots near the margins of the petals.

When these symptoms appear, run a soil test. If the pH value is below 5, add lime to build up the calcium supply.

Most soils are well supplied with iron, but in some sections of the country—the Great Plains area, for example—iron may be deficient. This deficiency causes the foliage to turn yellowish white. To correct it, spray the foliage with ferrous sulfate mixed at the rate of 1 ounce of the material to 2 gallons of water, or with iron chelates, mixed according to directions on the package. Also run a test for pH. If the pH is above 7, add sulfur to lower it.

Disbudding

For large exhibition or single-stem roses, disbud the plants when the buds are very small. Remove all but the terminal bud on each stem. The terminal bud then develops into a much larger flower.

The flower clusters of polyanthas and other roses bearing many flowers per stem also will be improved by disbudding. Remove some of the buds from each stem—the more buds you remove, the larger the remaining flowers will develop.

Cutting Flowers

Cutting rose flowers is in itself an important cultural operation. Improper cutting can injure the plant and decrease its vigor.

Use sharp tools to cut flowers. Breaking or twisting off flowers injures the remaining wood.

It probably is best if you do not cut any flowers during the first season of bloom. If early flowers are not cut, the plants usually develop into large bushes by fall. Some flowers may be cut then.

When cutting flowers, allow at least two leaves to remain between the cut and the main stem.

If you do cut flowers during the first season, cut them with very short stems only. Removal of foliage with long-stemmed flowers robs the plant of its food-manufacturing capacity and cuts down on its growth and subsequent flower yield.

Even when the plants are well established it is unwise to cut stems any longer than actually needed. At least two leaves should remain between the cut and the main stem.

Hybrid tea roses usually have three leaflets at the top of the rose stem, and below that a spray of five leaflets. If the stem is weak, make the cut just

above the topmost spray of five leaflets. If the stem is strong—as thick as a pencil—the cut may be made above a higher three-leaflet spray.

If you do not cut the flowers, remove them when their petals fall. Cut them with sharp shears or knife just above the topmost leaf. A withered individual flower in a cluster should be removed to give the remaining flowers more room to develop. After all flowers of a cluster have withered, cut off the entire stem just above the top leaf.

Roses that are cut just before the petals start to unfold will continue to open normally and will remain in good condition longer than if they are cut after they are fully open. Roses will keep best if they are cut in late afternoon.

REVIVING CUT FLOWERS

Cut flowers that start to wilt prematurely can be revived and their usefulness extended for several days. Make a slanting cut an inch or so from the base of the stem and place the stem in very hot water for a few minutes. Boiling water removed from the stove for a few minutes is satisfactory. Then plunge the stems quickly into cold water. The hot water drives off any air bubbles that may have formed in the stem and permits the cold water to rise and revive the flower. This treatment will not revive old flowers that have reached the full extent of their usefulness, nor flowers that have been wilted for several hours.

Preparing Roses For Show

Preparation of roses for exhibition starts when the buds first begin to form. Allow the center flower bud to develop, but pinch out all side flower buds as soon as you can detect them. The center bud then develops into a much larger flower than it would if the side buds were allowed to remain.

Just before the show, cut the bloom with a long stem. It should be in tight bud at time of cutting.

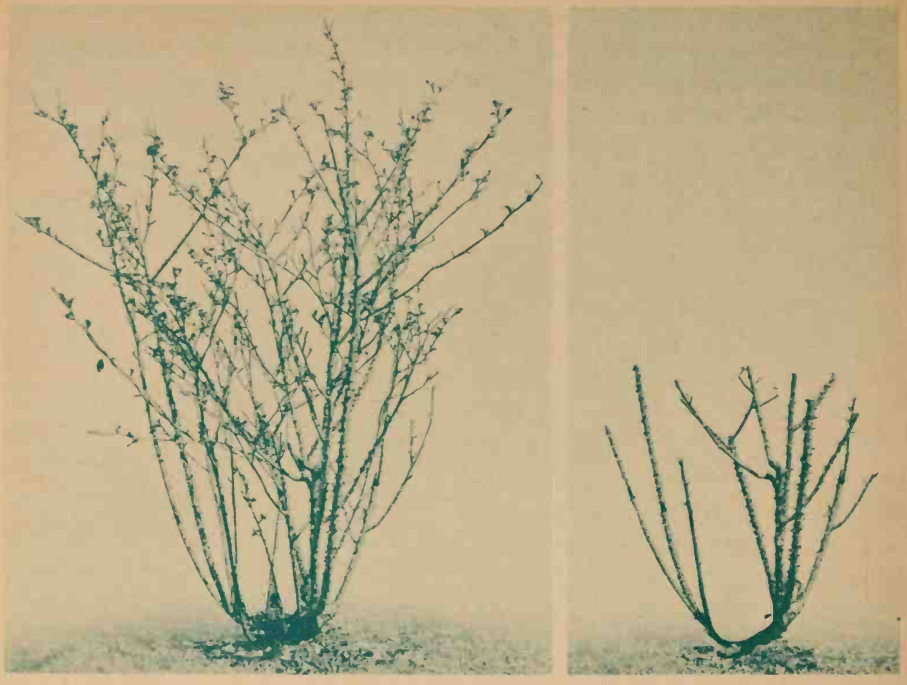
Immediately immerse the stem of the rose in cold water. Clean all vestiges of spray from the leaves, then store the bloom in a refrigerator at 50° to delay its opening. Remove it from the refrigerator in time to allow it to open between one-half and three-fourths at the time of the show.

Transport the bloom to the show carefully so as not to damage the flower or the leaves. At the show, set the stem straight in a vase of proper size to hold the flower upright. Attach to the stem a label or tag containing the variety name.

Pruning

Prune roses annually to improve their appearance, to remove dead wood, and to control the quantity and quality of flowers produced by the plants. If roses are not pruned, they soon grow into a bramble patch and the flowers are small and of poor quality. Sometimes undesired shoots come from the understock. These should be removed as soon as they appear, or they are liable to dominate the plant.

Rose pruning is not difficult. Use sharp tools. A fine-toothed saw is useful for cutting dead canes. All other



M—5007

Left, rose bush before pruning. *Right,* same bush after pruning; all dead wood and weak growth have been removed and canes have been cut to a uniform height.

pruning can be performed with pruning shears.

Do not leave bare stubs when pruning. Make all cuts to a cane, to the point on the crown from which the pruned member originated, or to a strong outward-facing bud.

Bush Roses

Prune bush roses in early spring, just before growth starts. First remove the dead wood; be careful to cut an inch or so below the dark-colored areas. If no live buds are left remove the entire branch or cane.

Next, cut out all weak growth and any canes or branches growing toward the center of the bush. If two branches cross, remove the weaker.

Finally, shape the plant by cutting the strong canes to a uniform height. In mild climates strong plants can be pruned to a height of 24 to 30 inches.

In some areas the winters are so severe that much of the top of the plant is killed. Under these conditions it is not possible to do much toward shaping the plants. Just cut out the dead wood, saving all the live wood you can.

Tree roses require heavy pruning in spring and some pruning during the growing season to keep the tops from becoming too large for the stems. After removing the dead wood, cut back the live canes to a length of 8 to 12 inches and shape the overall structure of the plant.

Most of the shrub roses should be pruned after they have bloomed. As

a rule, these plants are very hardy, so pruning is needed primarily to thin out and remove old canes. They do not require shaping; in almost all instances shrub roses are most attractive when they are allowed to develop their natural shape.

Climbing Roses

Prune hardy ramblers just after they have flowered. This pruning stimulates new cane growth and development of new laterals on which the next year's flowers will be borne.

Where ramblers are trained to a trellis or support so high that one season's growth will not cover it, cut off some of the older shoots. Shorten strong, vigorous canes. This pruning will stimulate laterals to develop and continue to elongate and eventually cover the trellis.

In spring remove all dead canes and weak branches. Prune sparingly; removal of too much wood at this time will reduce production of flowers.

Many of the large-flowered climbers—especially the everblooming types—do not produce as much growth each year as the hardier climbers. For this reason pruning must be less severe.

Winter Protection

Roses must be protected not only against low winter temperatures but also against fluctuating temperatures. Occasionally, rose varieties that are hardy in the North where winter temperatures are constantly low are injured during the winter in areas farther south where the temperature fluctuates considerably.

As the first step in avoiding winter injury, keep your roses healthy during the growing season. Roses that have been sprayed for disease control and have been properly nourished are more likely to escape winter injury than plants that have lost their leaves because of diseases or nutrient deficiencies.

Bush Roses

Immediately after the first killing frost, while the soil can still be easily worked, pile soil 8 to 10 inches high around the canes. It is best to bring in soil from another part of the garden for this; if you dig it from the rose beds you may injure the roots of the rose plants. After mounding soil about the canes, tie all the canes together to keep them from being blown about and loosening the root system.

Inspect the plants frequently to be sure the soil is not washed away before the ground freezes.

Protection by mounding usually is effective if the temperature does not drop below zero.

Where the temperature regularly goes below zero, further protection is necessary. Pile hay, straw, or strawy manure over the mounded canes. Hold it in place by throwing on a few shovelfuls of soil.

Remove covering materials—straw and soil—in spring as soon as danger of severe frost has passed. Remove the soil mound carefully to avoid breaking off any shoots that may have started to grow beneath the mound.

Tree Roses

In areas where the temperature does not often go below zero, wrap the heads

of the plants in straw and cover with burlap.

Where the temperature goes to 10° to 15° below zero, protect tree roses by covering the plants with soil. Do this by digging carefully under the roots on one side of the plants until the plants can be pulled over on the ground without breaking all root connections with the soil.

Cover the entire plant with several inches of soil.

In spring, after the soil thaws and danger of severe frost is past, remove the soil cover and set the plants upright again.

Climbing Roses

Climbing roses need protection in areas where the temperature regularly drops below zero. Lay the canes on the ground, hold them down with wire pins or notched stakes, and cover them with several inches of soil. Remove the soil in spring after danger of severe frost is past.

Propagation

Most varieties of roses can be propagated from cuttings taken during the summer or in fall.

Take summer cuttings after the flowers have fallen. Make 6- to 8-inch cuttings from the stems. Remove all leaves except one or two at the top. Then plant the cuttings with half their length below the ground. Water them, then invert a fruit jar over them. Remove the fruit jar the following spring.

Take fall cuttings after the wood has ripened well. Cut the stems into 8- or 10-inch lengths, remove all leaves, and plant the cuttings in a well-protected sunny place with only the top bud above the ground. When freezing weather approaches, cover the cuttings with a mulch of litter several inches deep to keep the ground from freezing.

Diseases and Insects

Many different diseases and insects attack roses. These pests vary in type and severity from area to area. You can control most of them effectively—no matter where you live—if you follow these general recommendations:

- Buy plants that are free of diseases and insects.
- Keep your rose garden cleaned of weeds, fallen rose leaves, and diseased or insect-infested canes.
- Apply pesticide sprays or dusts as needed.

Three types of pesticides are used on roses: Fungicides for diseases; miticides for spider mites; and insecticides for insects. You can use them in dusts or sprays. Ready-to-use dusts are available from pesticide dealers. Few sprays come ready to use on roses. It is usually necessary to prepare sprays by mixing wettable powders or emulsifiable concentrates with water.

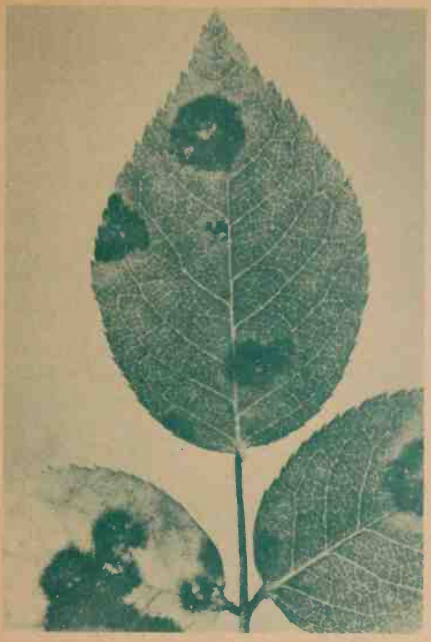
Select the pesticides by studying this section and the pesticide container labels. Follow label directions for dilution and care in handling.

Diseases

Of the many diseases attacking roses, black spot, powdery mildew, rust, crown gall, and the cankers are the most serious.

Black Spot

Circular black spots, frequently surrounded by a yellow halo, appear on the leaves. Infected leaves turn yellow and fall prematurely. Severely at-



M—5010

Black spot. If black spot is unchecked, the infected plant may lose most of its leaves.

tacked plants may be almost completely defoliated by mid-summer. The plant is weakened, becomes subject to winter injury, dieback, and stem cankers.

Black spot is spread by water, which must remain on leaves for at least 6 hours before the infection takes place.

Severe pruning in spring eliminates some infected canes on which the disease overwinters. Begin spraying or dusting when leaves are half grown. Spray or dust weekly throughout the growing season.

Maneb, zineb, and folpet are effective for black spot control.

Powdery Mildew

White powdery masses of spores appear on young leaves, shoots, and buds. Young shoots may be swollen or distorted. Foliage may be stunted. Unopened buds may be covered with powdery masses of spores.

The disease is spread by wind. It overwinters on fallen leaves and in infected bud scales and flower stems.

For control during growing season, apply folpet or dinocap. Do not apply dinocap when the temperature is above 85 degrees.

Rust

Yellow or orange pustules appear on leaves. Plant may be defoliated. Disease may also attack young stems. Rust overwinters in fallen leaves. It is spread by wind. For control, apply zineb or maneb (registered for use on rust in California only).

Rust is favored by cool, humid summers and mild winters. It is troublesome primarily along the Pacific coast.

Cankers

Cankers occur commonly in plants that have been weakened by black spot, winter injury, or poor nutrition. They

M-5011

Powdery mildew on rose leaflets. When severe, this disease may cause premature falling of the leaves.

first appear as small reddish spots on the stem. They enlarge and eventually encircle the stem, causing the cane to die.

For control, keep bushes free of black spot, provide them with proper winter protection, and use care when pruning. When pruning, make clean cuts near a bud. Prune out all cankered canes. Disinfect pruning tools with alcohol after use on a cankered shoot.

Crown Gall

Galls begin as small swellings, usually at ground level but sometimes on the upper part of the stem or on the roots. They slowly increase in size. Infected plants become stunted and may die.

Control is a matter of prevention: buy plants free of crown gall and plant them in soil that has been free of crown gall-infected plants for at least 2 years. If crown gall appears, remove the infected plants and burn them.

Virus Diseases

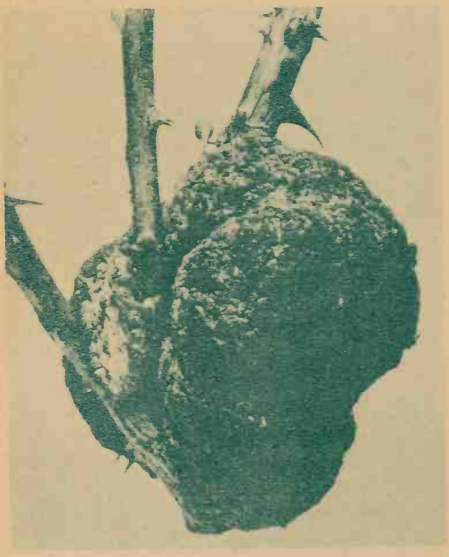
Rose viruses are spread by propagation of infected plants. The diseases do not seem to be spread by insects or by handling.

Viruses cause small, angular, colorless spots on the foliage. Ring, oakleaf, and watermark patterns also may occur. Infected plants may be otherwise unaffected or they may be slightly to severely dwarfed.

The only control for viruses is prevention; buy plants that are free of the symptoms of virus diseases.

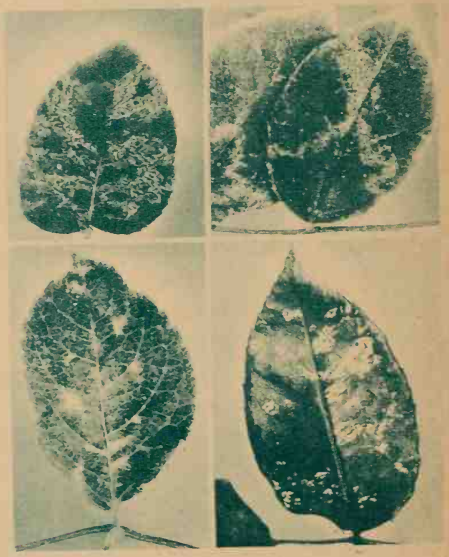
Insects

Roses are attacked by a large number of insects. The most common ones are the Japanese beetle, rose chafer, rose leaf beetle, rose leafhopper, flower thrips, rose aphid, rose scale, rose midge, leaf-cutter bees, two-spotted spider mite, rose stem sawfly, raspberry cane borer, rose stem girdler, mossy rose gall, and rose root gall.



M-5013

Typical crown galls on rose. Infected plants cannot be cured.



M-5014

Virus-infected rose leaflets. Do not buy plants with discolored leaflets.

M-5015

Japanese beetles feeding on a rosebud.

When preparing blooms for exhibit, it may be desirable to protect prized plants and flowers from insect attacks by covering them with cheesecloth or other coarsely woven cloth on a light framework.

Japanese Beetle

The Japanese beetle attacks rose flowers and foliage during July and August. This beetle is about 3/8-inch long. It is metallic green with coppery-brown wing covers. In areas of moderate infestation plants can be protected against the Japanese beetle by frequent application of carbaryl or malathion.

In heavily infested areas you may have to cover the flowers with cheesecloth cages or bags to protect them from injury.

Rose Chafer

Yellowish-brown beetles, known as rose chafers, are often abundant in the North during June and early July, especially in areas of light, sandy soil. They are about 1/2-inch long and have long spiny legs. They appear suddenly on rose petals where they feed. They may destroy the entire flower. For control, use carbaryl.

Rose Leaf Beetle

The rose leaf beetle is a small metallic-green beetle that feeds in the buds and on the flowers of roses, often riddling them with holes. The insects are most numerous in suburban gardens near uncultivated fields. For control,

M 5017

Rose slugs feeding on a leaflet.

direct malathion spray or dust into the open flowers.

Rose Leafhopper

The rose leafhopper, a tiny greenish-yellow jumping insect, is frequently found on the underside of rose leaves. It sucks out the contents of the leaf cells causing a stippling of the leaves that resembles injury by spider mites. For control, apply dimethoate to the underside of the foliage.

Rose Slugs

Rose slugs, the larvae of three species of sawflies, feed on the leaves of roses. Their injury is recognized by the skeletonized effect on the leaves. For control, use carbaryl. Treatments must be applied promptly; the insects appear suddenly and do their damage quickly.

Thrips

For several weeks each summer the petals of garden roses, especially white varieties, may become brown. This injury is caused by the flower thrips and related species that enter the opening flower. The tiny yellow or brown insects can be seen if an infested flower is shaken over a sheet of white paper.

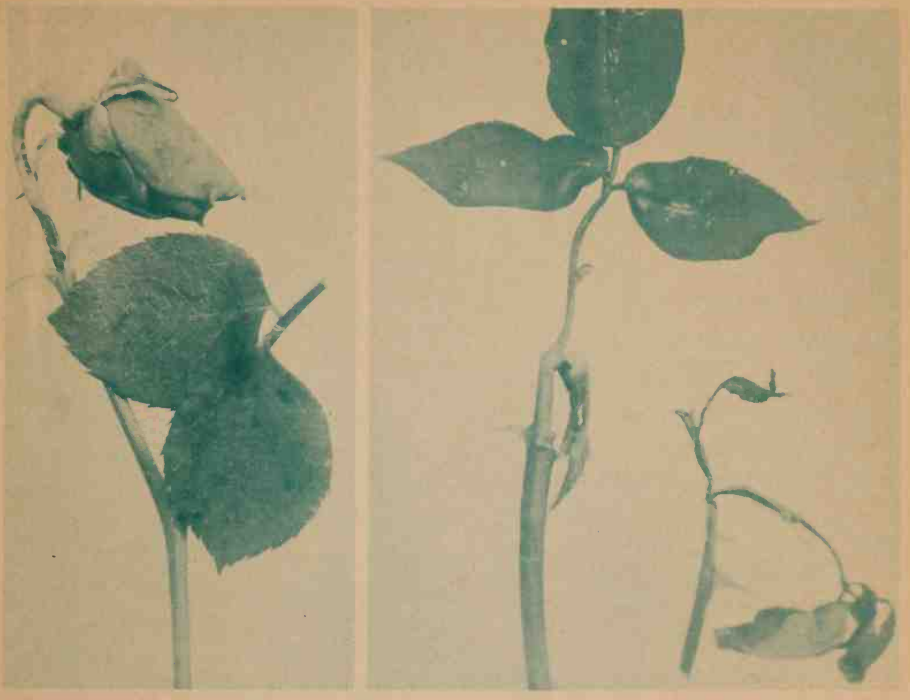
No fully satisfactory control is avail-

M-5020

Aphids feeding on rosebuds.

M-5021

Rose cane severely infested with rose scale.



M—5022

Deformed rosebud and dead plant tips, caused by the rose midge.

able because of the daily influx of thrips to the rapidly expanding flowers, which cannot be kept adequately covered with an insecticide. Dimethoate spray applied to flowers and buds every 2 or 3 days will destroy many thrips as they alight on flowers. Cheesecloth cages or bags around prized blooms may be practical to protect them from damage.

Aphids

Several species of aphids occur on stems, leaves, and buds of roses. By sucking the plant juices they stunt the plants. They often occur in large numbers on rosebuds. The insects also secrete a sticky honeydew, which accumulates on foliage.

For control, apply dimethoate spray as needed.

Rose Scale

Old rose stems sometimes become encrusted with white insects known as rose scale. These insects suck sap from the plants.

Dimethoate spray applied at least once every 2 weeks during the summer will reduce the number of scales by killing the young rose scale crawlers. If scales persist until fall, prune out the stems that are most severely infested. During the dormant season, spray the remaining stems with a summer-oil emulsion.

Rose Midge

The rose midge is sometimes a serious pest of roses. This tiny yellowish fly lays its eggs in the growing tips of the rose stems. The maggots that hatch

from the eggs destroy the tender tissue, killing the tips and deforming the buds.

Cut and destroy the infested tips daily for 1 month to eliminate the maggots before they complete their growth and drop to the ground. No satisfactory insecticide control is available.

Leaf-Cutter Bees

Leaf-cutter bees cut circular pieces from rose leaves and other plants and store them as food for their young in burrows dug in the pith of rose stems, broken branches, or in plant crevices. The tunneled stems usually die back for several inches.

No satisfactory insecticide control is available for these bees, which are valuable as pollinators of alfalfa and other plants. A carpet tack pushed into the end of the cut stem at pruning time will prevent the bees from entering and tunneling the stems. Tree-wound paint can also be applied to the ends of the cut stems.

M-50230

Circular pieces cut out of rose leaflets by leaf-cutter bees.

Spider Mites

The two-spotted spider mite and related species suck the juices from rose leaves, which soon become stippled. As the injury progresses the leaves turn brown, curl, and drop off. When the mites are abundant they spin a web over the leaf surface. Infested plants are unthrifty.

These spider mites usually are greenish with two brown spots, although some are dark red. They are almost too small to be seen without a magnifying glass. The mites overwinter as adults on leaves of living weeds or perennial garden plants. They become abundant in hot, dry weather.

When carbaryl is used to control other pests it destroys insect enemies of spider mites and the mites tend to become more numerous. To control spider mites, clean up trash and living weeds in early spring and make weekly applications of a spray containing either dimethoate, dicofol, or tetradifon.

Rose Stem Borers

The stems of garden roses are occasionally infested with one of several kinds of borers. These stems usually die back, and those infested with the stem girdler develop a marked swelling at the point of injury.

Cut and destroy infested stems.

Rose Galls

Several species of wasplike insects lay their eggs in stems of roses and their larvae cause large swellings or galls. One species makes a gall resembling fibrous moss on the stem.

Another causes a large wartlike gall near the ground surface. These galls may be confused with crown galls, which are caused by bacteria. However, if insect galls are cut open, numerous larvae—or the cells in which they develop—will be visible.

No insecticide known will control the insects that produce these galls. The best available control is to prune the infested stems to remove the galls and bury them promptly to destroy the larvae in the galls before they emerge.

Precautions

Federal and State regulations require registration numbers on all pesticide containers. Use only pesticides that carry this designation. Read and follow all directions on the label.

USDA publications that contain suggestions for the use of pesticides are normally revised at 2-year intervals. If your copy is more than 2 years old, contact your Cooperative State Extension Service to determine the latest pesticide recommendations.

The pesticides mentioned in this publication were federally registered for the use indicated as of the issue date of this publication. Because the registration of a pesticide that you have had in your possession for some time can be changed, you may wish to check with your local agricultural authorities to determine the registration status of the pesticide.

CONTROL

The pesticides mentioned in this publication are available in several different formulations that contain varying amounts of the active ingredient. Because of differences in active ingredient, dosage rates are not indicated in this publication. The user is cautioned to read and follow all directions and precautions given on the label of the pesticide formulation that will be used.

This edition replaces all previous editions of this publication. Because of changed insecticide recommendations, earlier copies should be destroyed.

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